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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/734,050
Filing Date: December 11, 2003
Appellant(s): GORDON, ANDREW W.

Dr. Stanley A. Kim, Ph.D., Esq.
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 2/7/07 appealing from the Office action mailed 10/13/06.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct. Please note that the summarized independent claim 27 has been allowed as correctly stated in the Status of Claims and Grounds for Rejection.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

GROUNDS OF REJECTION NOT ON REVIEW

The following grounds of rejection have not been withdrawn by the examiner, but they are not under review on appeal because they have not been presented for review in the appellant's brief.

Claims 24 and 25 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with **the enablement requirement.**

Note: there are two parts to the rejection under 35 USC 112, first paragraph. The first part is for new matter, and includes all claims including claims 24 and 25, which is under review on appeal. The second part, which includes only claims 24 and 25, are for enablement requirement, which is not included for review by the appellant.

(7) Claims Appendix

A substantially correct copy of appealed claims appears on page 26 of the Appendix to the appellant's brief. The minor errors are as follows: claims on appeal are 15-25,28,30-35 and 37-41. The claims list in the Appendix contains claims 15-25,27,28,30-35 and 37-41. Claim 27 is allowed and is not on appeal.

(8) Evidence Relied Upon

6,348,148	BOSLEY	02-2002
6,658,889	KRYLOV	12,2003
6,299,766	PERMAR	10,2001

Lampe, H., et al., "PCS-Presussag Conversion System (R) Mobile floating seawater desalination plant", Desalination 114(1997) 145-151.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

A. Claims 15-26 and 28-35 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. [Underline added in Examiner's Answer]

The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The negative limitations, "at least one discharge port being positioned at a site not at the first depth" (claim 15), and "at a site not at the first depth" (claim 28) do not seem to have support in the original disclosure. See MPEP 2173.05(i) about negative limitations.

Applicant's arguments (7/27/06) does not provide support for this limitation. Figure 6B and paragraph 131, while showing support that "not at first depth" as being at a lower depth in the ocean than the location of the intake with reference to the ship, does not provide adequate disclosure for the infinite possibilities for the locations which

are "at a site not at first depth". *For example, there is no support for the possibility that the concentrate discharge is in the air, sprayed from the ship in to the air 10 ft above the ocean surface.* Since applicant's invention is about how the concentrate is being discharged, such broad limitations in claims added during prosecution would bring in new matter.

B. Claims 24 and 25 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. [Underline added in Examiner's Answer]

The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The claims recite instrumentation and sensors for detecting depth of thermocline and plankton in the ocean. However the specification as originally filed does not provide any details of the instruments and sensors for one of ordinary skill in the art to determine the depth of thermocline and plankton under the sea.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –
(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 15 and 28-30 are rejected under 35 U.S.C. 102(e) as being anticipated by, or under 35 USC 103(a) as being obvious over, Krylov (US 6,658,889).

Krylov teaches a system and a process of desalinating seawater aboard a ship by reverse osmosis having a water intake (7) positioned in the body of the seawater, a mixing space (2) for mixing seawater with RO concentrate (makes ice slush with sea water and concentrate mixture), and a discharge of the mixture (inherently, the ice slush would be discharged at some point), which is inherently a site which is not at the first depth, but at a different point. The express, implicit, and inherent disclosures of a prior art reference may be relied upon in the rejection of claims under 35 U.S.C. 102 or 103. "The inherent teaching of a prior art reference, a question of fact, arises both in the context of anticipation and obviousness." In re Napier, 55 F.3d 610, 613, 34 USPQ2d 1782, 1784 (Fed. Cir. 1995) (affirmed a 35 U.S.C. 103 rejection based in part on inherent disclosure in one of the references). See also In re Grasselli, 713 F.2d 731, 739, 218 USPQ 769, 775 (Fed. Cir. 1983).

Please note that the new amendment of claim 15 (7/27/06) has made it broader than before.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 28, 31 and 32 are rejected under 35 USC 103(a) as being unpatentable over Bosley (US 6348148).

Bosley teaches a continuous process for making desalinated water by reverse osmosis (abstract, figures) from seawater. The system is offshore, on a ship (column 4 line 65 teaches the system suspended from a ship, which would be 'on a ship' (during examination, the claims must be interpreted as broadly as their terms reasonably allow. > In re American Academy of Science Tech Center, ___ F.3d ___, 2004 WL 1067528 (Fed. Cir. May 13, 2004)(The USPTO uses a different standard for construing claims than that used by district courts; during examination the USPTO must give claims their broadest reasonable interpretation)); comprises a vessel (50) for producing a permeate (column 5 lines 4-67), concentrate discharge below the thermocline (lines 35 and 58), intake (column 5 lines 25-33), the intake of sea water and the discharge of concentrate at different levels, permeate delivery means comprises pipeline, transfer pumps, second vessel, etc: see column 5 lines 36-48.

Depth of intake to avoid planktons: Bosley has the system operating at a depth, not at the surface, which would inherently avoid planktons.

Bosley teaches mixing concentrate with seawater at the point of discharge for dilution – column 4 lines 1-20, which is an obvious equivalent of applicant's claim of diluting the concentrate and then discharging into a body of seawater.

3. Claims 15-23, 28-35 and 37-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lampe, et al, "PCS-Preussag Conversion Systems", Elsevier, 1997, in view of Permar (US 6,299,766) and/or Bosley'148.

Lampe teaches a system and a process of desalination using reverse osmosis as claimed, wherein the system is installed on board a ship. However, Lampe does not teach the specifics of water intake and concentrate discharge.

Permar teaches a desalination system for sea water having reverse osmosis membranes, in which the concentrate is diluted by mixing with seawater before discharge in a plenum (44): see abstract, column 1 lines 50-64, column 3 lines 23-40 and figure 1. It would be obvious to one of ordinary skill in the art at the time of invention to use the teaching of Permar in the teaching of Lampe because Permar teaches a system which provides highly effective filtering with expenditure of considerably less energy and improved recovery from subsequent downstream filters in a series of filters, unlike the prior arts.

Bosley teaches a process of desalination and system either suspended from a ship or moored to the sea floor, including water intake, concentrate discharge and the requirement of mixing seawater with the concentrate properly at discharge to avoid pollution of the environment of discharge as discussed in paragraph 1 above. It would be obvious to one of ordinary skill in the art at the time of invention to use the teaching of Bosley in the teaching of Lampe for the proper operation of the system as taught by Bosley. It would be obvious to one of ordinary skill in the art at the time of invention to use the teaching of Bosley and Permar in the teaching of Lampe because Bosley

teaches protecting the environment by diluting the concentrate water at discharge; and Permar teaches diluting the concentrate in the system for improved performance, with concentrate discharged after dilution.

Some of the instant claims differ from the teaching of Lampe in view of Bosley in the recitation of the location of the water intake and concentrate discharge, the intake at below the thermocline region and discharge above, the concentrate discharge having a plurality of ports, and a mixing space aboard the ship. Bosley teaches in column 4 lines 1-20 that the discharge of the concentrate should be safe to the environment, and teaches discharging the concentrate where mixing of the seawater with ocean current would be very efficient. Bosley also teaches discharge of concentrate at a distance form the intake – see 38 and 40, figure 4, discharge at 14, figure 3, and figure 6 which has a different intake and discharge. These teaching would be equivalent to the applicant's claimed mixing, discharge of the concentrate water using multiple ports or at a distance from the intake. An express suggestion to substitute one equivalent component or process for another is not necessary to render such substitution obvious. In re Fout, 675 F.2d 297, 213 USPQ 532 (CCPA 1982).

Regarding the limitation of the sea going vessel having a draught of 10 meters – this pertains only to the size of the ship, which is not patentable. In Gardner v. TEC Systems, Inc., 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984), the Federal Circuit held that, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform

differently than the prior art device, the claimed device was not patentably distinct from the prior art device.

Regarding "sea chest": this is only a water compartment in the ship's hull, which is inherently present in all ships, such as the ballast tank.

Regarding the temperature and/or concentration of the concentrate being substantially equal to that of seawater at the point of discharge, Bosley recognizes this feature in the teaching that the concentrate is discharged at a location which has sufficient ocean currents to eliminate any adverse effect of such discharge.

(10) Response to Argument

Appellant's arguments are addressed in the same order as argued by the appellant.

A. The written description rejections of claims 15-26, 28, and 30-35 **are not erroneous:**

Appellant argues that the rejection is erroneous because the site of the concentrate discharge is adequately described in the application. This argument would not overcome the rejection of the negative limitation, "at a site not at the first depth". The rejection does not have the premise that the concentrate discharge is not adequately described. The rejection is about the term "at a site not at the first depth", which encompasses a much wider coverage than what is contemplated in the specification and the original claims.

This application is claiming an invention in which the inventive concept is about how the concentrate is being discharged. Therefore, terminology, especially the negative terms, introduced during prosecution further modifying the way the concentrate is being discharged, which has inadequate support in the specification and original claims, would add new matter.

The discharge port being located at a different depth in the body of seawater than the seawater intake may have adequate disclosure at the paragraphs cited by the appellant. However, all those cited figures and paragraphs only disclose the discharge port as being located under the hull, and under or at the ocean surface, whereas, "a site not at the first depth" would encompass any and all sites (locations) other than the location of the first depth, such as collecting in a tank, spraying in the air, distributing on land, etc., and such locations have no supporting disclosure. This is especially true when appellant makes arguments such as "Lampe and Permar combination fails to teach or suggest seawater intake at a first depth and concentrate discharge at a site other than the first depth" [page 23 of the Brief; underline in the Brief], and "Krylov fails to teach or suggest ... "... discharging the diluted concentrate into the body of seawater at a site not at the first depth" (paragraph linking pages 13-14 of the brief). When appellant's patentability, as is argued under art rejections, depends so much on the location of discharge of the concentrate, and when appellant so strongly argues that without explicit teaching one of ordinary skill in the art would fail to recognize that the prior arts would have implied/inherent teaching that the discharge is at a different location than the intake, whereas for appellant's own invention, the same 'one of

ordinary skill' would "readily understand that appellant was in possession of those concepts" without adequate supporting disclosure, this rejection is proper. Applicant also has not made any statement that discharge at "a site not at the first depth" language is limited to discharge at or under the ocean surface to withdraw this rejection.

The examiner, when citing an example of spraying concentrate in the air, did not intend any sarcasm. It was provided as an example of "a site not at the first depth", but not contemplated by the appellant's specification. In fact, spraying in the air would effectively dilute the concentrate by distributing it over a vast expanse of the sea by the spray and also by wind before it falls in to the sea. Such a method is inexpensive compared to the volume of water that must be pumped to dilute the concentrate on board before discharge, and much more efficient. Applicant's claim language "at a site not at the first depth" would read on spraying in the air.

The rejection of Claims 24 and 25 over 35 USC 112, first paragraph, enablement, is not on review. However, the Office has not withdrawn that rejection.

B. Claims 15, 28, and 30 **are anticipated by or obvious over Krylov** because Krylov **has implied teaching** that there is a discharge port and that it implies discharging diluted concentrate.

Appellant's argument with respect to this reference is that it fails to teach a discharge port and to discharge either diluted or undiluted concentrate.

Krylov teaches a fishing vessel having a reverse osmosis desalination system, which produces water for drinking and concentrate water. Drinking water is stored for drinking. Concentrate water is mixed with seawater to feed an ice slush maker (column 3, lines 30-32). Intake for the desalination system is by a submersible pump from the sea – intake apparatus positioned at a first depth - column 3, lines 21-23. A mixing system for mixing concentrate with seawater – ice slush tube with the scrapper assembly (column 3, lines 50-55), an impeller attached to the scrapper (column 4 lines 8-11) and vigorous agitation (column 6 lines 45-56), with inlets and outlets – see (2), figure 1.

Krylov is silent on disposing the ice slush. However, the system is operated continuously (see column 1, lines 9-14: describes a continuous process; column 7, lines 1-4: waste brine or seawater is constantly pumped through the system; column 8 lines 25-31: seawater warmed up in the condenser of the refrigeration system can be pumped through the reverse osmosis system at 77F (optimum for reverse osmosis operation) thus saving energy). When the system operates continuously to produce the concentrate and the ice slush, the slush tank has to be drained, either continuously or intermittently, to keep up with the operation of the unit (otherwise, it would overflow). The slush tank only has a finite capacity. Thus the Krylov system, therefore, will have a concentrate discharge port (implied in the reference). Such a port will be at a different location than the intake, because first of all, it is physically impossible to have the intake and discharge at the same location. Secondly, the discharge would be on the tank, intake pump is at the reverse osmosis unit.

Even if the Krylov system is judged as not anticipating a discharge port at a location different from that of the intake, it still would be obvious, because one of ordinary skill in the art would readily realize that the ice-slush water will have to be drained at least occasionally to maintain steady state production of the slush and drinking water continuously, or at least at the end of the day, when the fishing business is closed, to clean-up, at which time, the discharge will not be at the same spot as the intake.

Appellant had argued that the ice slush might never be discharged, or discharged only on land. These are not possible or probable options because, for continuous production and to maintain the tank level, especially with the volume of fish that is being added on into the tank during fishing, water has to be removed from the tank during fishing. Discharge of the slush tank fixed to the vessel on land is also not a reasonable argument. Argument about 37 CFR 104 is not germane to patentability. The Examiner believes that the explanation given in the rejection is sufficient for one of ordinary skill in the art to understand the rejection. Disposal of the water from the ice slush used for preserving fish for continuous operation and also for cleanup at the end of the day is readily understandable to one of ordinary skill in the art.

In addition, Claim 15 is an apparatus claim; process of discharging to the ocean is not a patentable limitation for the apparatus claim. Moreover, claim 15 does not recite a step of discharging concentrate in to the ocean. For the process Claims 28 and 30, the recitation of discharging into the ocean is not a sufficient limitation for

patentability over Krylov even if somehow Krylov were to be construed as teaching only a land-based discharge of the ice slush.

C. Rejection of claims 28,31 and 32 over Bosley is proper:

Appellant argues that Bosley does not teach discharging diluted concentrate, and does not teach a sea-going vessel positioned on the surface of a body of seawater.

The differences between claim 28 and the teaching of Bosley, as raised by the appellant, are (1) whether Bosley teaches or suggests a method of desalinating seawater on a sea-going vessel positioned on the surface of a body of water, and (2) whether Bosley teaches or suggests discharging the diluted concentrate into the body of seawater.

To answer the first part: Bosley teaches a desalination system, which is positioned at a depth in the ocean so that the head of water above the system would provide the feed water pressure required to desalinate seawater, and thus avoids expensive pumps and operation costs. Bosley teaches one embodiment where the system is moored to the ocean floor, and alternate embodiments wherein the system is supported by floatation devices or suspended from ships (column 4, lines 64-67).

In Bosley's embodiments of the system supported by floating devices or suspended from a ship, the system is part of the floating device or ship (the term "vessel" is considered as meaning a ship or floating device on the sea), and thus the intake and the process of desalination are all considered as happening on or in the vessel. This is appropriate when claim 28 is given the broadest reasonable

interpretation as is practiced by PTO. It is also appropriate, considering that claim 28 does not recite that the desalination system is mounted on the vessel. It is also appropriate when applicant has intakes and discharges to the system located at several hundred feet below the ship's hull. Thus the reference anticipates this part.

The teaching of Bosley of suspending the system from a ship or supported by floatation devices would also be equivalent to the system mounted on a ship. Systems mounted on ships are also well known in the art, as is seen in Krylov, and the NPL reference to Lampe. Therefore, a system mounted on a ship is not a patentable invention. Discharging the diluted concentrate is also not a patentable invention, because Bosley teaches the need for diluting the concentrate before discharge.

A claimed device is portable or movable is not sufficient by itself to patentably distinguish over an otherwise old device unless there are new or unexpected results. *In re Lindberg, 194 F.2d 732, 93 USPQ 23 (CCPA 1952).* Appellant's claim of the system mounted on board a ship is only making it portable over Bosley's teachings. Additionally, Bosley's systems suspended from a ship or supported by floating devices are also portable. And Appellant's claim 28 does not recite that the system is mounted on board the ship.

Regarding the second part, Bosley recognizes the problems associated with discharging the concentrate directly into the ocean – see column 1, lines 21-26 and column 4 lines 1-20. Bosley teaches that the concentrate must be mixed with seawater to sufficiently dilute it at the point of discharge, and finds an excellent solution by discharging the concentrate at a location where there are high ocean currents.

Therefore, Bosley makes discharge of "diluted concentrate" at a location 'at a site not at the first depth' very obvious.

Therefore, claims 28, 31 and 32 are not patentable over Bosley.

Please note that appellant's claims that showed sufficient structural detail of how the concentrate is being diluted were allowed in a parent application and are indicated as allowable in this application as well.

With respect to appellant's complaint that the examiner did not respond to appellant's evidence, evidence being paragraphs [0039] and [0040] of the specification; these paragraphs are copied below:

> **[0039]** Another advantage of the present invention can be to mitigate the environmental impacts of a desalination facility.
>
> **[0040]** Another advantage of the present invention can be to discharge a concentrate solution having a salinity level substantially equal to a salinity level of the water surrounding the desalination facility.

As can be seen, these paragraphs do not constitute any additional evidence; no other secondary evidence in support of patentability of the claims was provided.

D. The rejection of claims 15-23, 28, 30-35, and 37-41 over Lampe in view of Permar and/or Bosley:

Appellant argues that the combination of the references fail to meet all the limitations. It will be shown that the combination of the references will show all the limitations.

Introductory Note: The Lampe publication describes a commercial venture in which single hulled oil tankers are retrofitted with reverse osmosis systems for the economic production of drinking water, with the concentrate waste stream produced by the system discharged to the sea. Appellant's invention is described in the specification as converting single hulled oil tankers (paragraph 182) with desalination systems, such as reverse osmosis, for producing drinking water, with the concentrate waste stream produced by the system being mixed with seawater before discharge into the sea to reduce the effects of release of concentrated saltwater at the location of release in the sea.

Lampe/Bosley combination suggests all claim limitations:

For Claim 15, with respect to Lampe in view of Bosley, appellant's contention is that the references do not teach a mixing space. This is not a patentable limitation without having any non-obvious structure for the 'space'. Please note that appellant's claims showing specific structure for "mixing" has been allowed or indicated as allowable.

Lampe in view of Bosley does not have a "space" for mixing, because Bosley teaches mixing at the point of discharge. However, this "space for mixing" is not a patentable limitation, because, the idea of mixing the concentrate with seawater to dilute it is already available to one of ordinary skill in the art from Bosley. How that mixing is to be practiced would be within the skill of one of ordinary skill; and one may mix the concentrate with seawater before discharge when faced with a situation where ocean

currents are not available (Such knowledge of mixing concentrate with feed water in a *space with inlets and outlets* is already known to one of ordinary skill – see Permar for evidence). Mixing must occur in a "space".

The next argument is that the examiner has ignored Appellant's prior arguments of the advantages offered by diluting concentrate with seawater prior to discharge as compared to Bosley's dumping of *undiluted* concentrate into mid-water location in a body of water for dispersion by ocean current. The advantages cited by the applicant are described in the footnote on page 20 of the brief, which not surprisingly, are also taught by Bosley, such as adverse effects to shoreline and ocean floors. Bosley also teaches that existing methods require greater plant infrastructure and have reduced process efficiency - see column 4, lines 1-10. Appellant's argument of July 27, 2006, is also unsupported by the specification.

With respect to Claim 16, a sea chest is only a compartment in the hull of the ship, which is commonly found in ships. In fact, ***Lampe teaches, "the tank located at the bow will contain the seawater intake ... ", which meets the claim "the apparatus for taking up seawater from the body of seawater comprises a sea chest"*** (Lampe, page 148, first paragraph of the left column, and the elevation of the ship showing the tanks or chests). Bosley teaches (column 5, lines 25-35) a pressure hull in which the reverse osmosis units are situated, and seawater is taken in to this pressure hull. The size of the ship is not a patentable subject matter as shown in the rejection.

With respect to claim 17, water intake member extendible from the hull into the body of water, where the intake first depth is greater than 10m: Lampe teaches intake details (page 148), but does not specify an intake conduit. Bosley teaches an intake conduit (28, figure 4 and column 5, lines 28-31), which is located more than 10m deep in the ocean. Regarding "extendible", since applicant's specification only shows pipes extending from the hull of the ship without any detail for "extendible" (***extendible*** means "to draw out or add to so as to increase in length" by Webster 's Dictionary. Appellant's specification does not have support for "intake member extendible from the hull", if the correct meaning of the word 'extendible' is used), having a length of pipe sticking out of the hull for the discharge port is not of patentable significance; applicant has not shown any patentable significance to a pipe extending from the hull.

Claim 19 reciting the discharge port more shallow than the intake. Position of the concentrate discharge whether below or above with respect to the feed port is not of any patentable merit, because they would be equivalent unless appellant can show otherwise; and there is no such showing. Argument, that Bosley's discharge of concentrate at a depth shallower than the intake would defeat the purpose of mid-water discharge, is not commensurate in scope with the rejection: the reference that is modified is Lampe, not Bosley. Modifying Lampe with the teaching of Bosley does not necessarily mean that the concentrate discharge automatically becomes below the intake. The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references.

Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). Only the teaching of the principle of diluting the concentrate from Bosley is being used in this rejection. Moreover, mid-water release of the concentrate in Bosley to take advantage of ocean currents does not necessarily mean that the discharge has to be below the feed intake; it only means that the discharge should be at a point where there is ocean current. (Bosley may be using the point of discharge at a lower elevation than the feed intake, but for a different reason: to maintain the density gradient to drive the concentrate out without having to use energy to pump it out. However, this has nothing to do with the discharge where there is ocean current for mixing the concentrate with seawater quickly to dilute it). Additionally, Bosley teaches a discharge port (for the permeate) that is above the sea level.

Claims 20-23 recite various locations of the intake and the discharge, which covers all the possible combinations with respect to the thermocline and level of planktons in the sea, which do not provide any patentable subject matter over the teaching of Lampe in view of Bosley, especially when Bosley teaches intakes in the depth of the ocean. There can be no criticality, when all possible combinations are claimed.

Argument that Lampe and Permar combination fails to teach or suggest seawater intake at a first depth and concentrate discharge at a site other than the first depth:

This is the only argument put forth by the appellant with respect to the rejection of the claims over Lampe in view of Permar. This difference is not a patentable difference for the simple reason that it is not physically possible to locate the intake and the discharge at the same location, unless the intake and the discharge are through the same line or point. In addition, one of ordinary skill in the art would not discharge the concentrate in the vicinity of the intake to prevent the intake drawing in the discharged water, thus starving the system of the feed water. Thus, this limitation is not patentable because it is implied or inherent in the references. ***Moreover, Permar (figure 1) shows discharge (line 54) being directed away from the feed intake (at 12)***

Argument that Lampe/Bosley/Permar combination fails to teach or suggest disclosure of diluted concentrate:

In this rejection, it is established that Lampe teaches the ship-board desalination unit as claimed by the appellant, but does not teach specifics about intake and discharge, such as intake being at first depth and discharge being at a site not at the first depth. As pointed out above, first of all, it is not physically possible to have intake and discharge at the same spot. Secondly, one of ordinary skill in the art would not put the intake and discharge at close vicinity to each other to prevent the intake sucking in the discharge, and thereby starving the system of the feed. Permar shows the discharge as directed away from the intake in figure 1. Bosley teaches intake and discharge at different locations (see figures).

Lampe also does not teach mixing the concentrate with seawater before discharge. However, Bosley teaches that concentrate cannot be discharged, as is, into the ocean because of the adverse effects to the environment, and recognizes the need for diluting the concentrate at discharge (column 4 lines 1-20). Permar teaches mixing the concentrate with feed for a different reason – to make the system more efficient. Thus one of ordinary skill in the art would combine Permar and Bosley with Lampe for protecting the environment as taught by Bosley and improving efficiency as taught by Permar.

With respect to the Permar reference, appellant's contention that Permar does not teach discharge of diluted concentrate is incorrect.

Permar (figure 1) teaches an intake pump at 12, a prefilter (14) and then the intake water is distributed into to plenum (26) through pressure recovery pump (10), and to plenum (44). In plenum (44), fresh feed water (seawater) is mixed with the recirculated concentrate (column 3, lines 32-40), and the diluted concentrate is pressurized by the pressure recovery pump (46) and fed to the first reverse osmosis module (18) at (34). The diluted concentrate from plenum (44) is also discharged through the discharge line (54) through the adjustable control valve (56). The adjustable control valve controls the feed water recirculation (see column 3 lines 38-40).

Plenum (26) in Permar distributes ***seawater (fresh feed)*** separately to each of the modules (18-24) through path marked (16) – see column 2, lines 40-62. Seawater is also mixed with the recirculating diluted concentrate at the feed entry (34) of each filter module (to make the concentrations the same for all modules at each inlet port

(34)). The concentrate leaving the last module (24) at (38) flows through the line (42) into the part (43) of the pressure compensated recirculation pump, and the concentrate flows in to plenum (44) for mixing with the fresh feed water (seawater). Thus it is the diluted concentrate that is partly recirculated and partly discharged by the control valve (56). The recirculated part of the diluted concentrate from plenum (44) flows through metering pump (46) to feed point of first module (18) at (34) (see column 3 lines 7-17).

As understood by the Examiner, Permar teaches mixing the concentrate water with fresh seawater at plenum (44), and also with proportioned amounts of seawater at the inlet (34) of each reverse osmosis filter (18,20,22,24). This is done to maintain the same feed concentration for all the filters. However, this understanding is not really required for one to use the teaching of Permar in the teaching of Lampe. ***Only the teaching of Permar of mixing the feed with the concentrate for improving the performance of the system, as acknowledged by the appellant, is required for the rejection.***

Since the discharge line that is leaving the plenum, is branching off from the recirculation line of the diluted concentrate to the first module (18), it is the diluted concentrate that is being discharged by Permar. The discharge line having the control valve (56) also determines how much of the diluted concentrate is recirculated and how much is discharged. Thus Permar teaches a space for mixing (plenum) with inlet for seawater and concentrate, and discharge outlet for diluted concentrate.

Even if one were to consider the argument submitted by the appellant that there is no specific teaching in Permar about discharging diluted concentrate, even then it

may be readily observed that Permar discharges a diluted concentrate. Appellant admits that Permar does mix concentrate with seawater to provide diluted concentrate as feed for all modules at about same concentration. Thus the discharged concentrate is still the diluted concentrate, not a concentrate of high salinity as would be expected from the standard systems (that operate a plurality of filters in series). Appellant's Claims 15 and 28 do not recite that the concentrate is diluted downstream of all the reverse osmosis filters and immediately before discharge; claim 15 only recites that it is mixed in a mixing system comprising a space installed on the vessel; and claim 28 does not even recite that it is mixed on board the vessel. Moreover, the basic idea of the invention is that the concentrate is discharged at a concentration that is not detrimental to the environment, not where or when it is diluted. Permar provides the details for dilution of concentrate by mixing feed seawater with the concentrate, albeit for a different purpose than that of the appellant's, having a space with inlet and outlet (plenum 44 or 26 or the pipelines at junctions 34, which are all "spaces" having inlets and outlets). The office does not have the premise that Permar teaches discharging a diluted concentrate for the purpose of protecting the environment. ***Permar is used only for its teaching of mixing the feed and concentrate, and for its teaching of the mixing space. Bosley teaches the need for diluting the concentrate to protect the environment.***

Permar teaches improving efficiency – see column 3 lines 23-31. One of ordinary skill in the art would use the teaching of Permar in the teaching of Lamp therefore to improve efficiency, and it's teaching of the mixing space. As shown before,

Bosley teaches the benefits of diluting the concentrate for the environment. Thus one of ordinary skill in the art would use the teachings of Permar and Bosley in Lampe, Permar for improving the efficiency of the system, Bosley for protecting the environment of the discharge by diluting the discharge, and the combined teaching for diluting the discharge within the system before discharge so that the system works more efficiently and also protects the environment.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted

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4/16/07

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